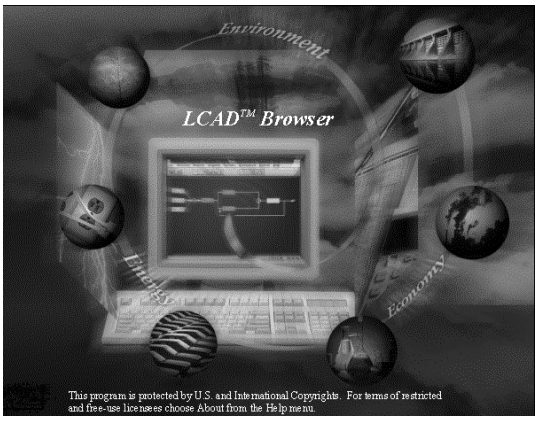
Tools from DOE/DOD; EPA Work in LCA

Slide Presentation

Life-Cycle Assessment Tools and Databases



Ken Humphreys

Pacific Northwest National Laboratory

Sustainable Technology Development , Chief Engineer

Carbon Management Initiative, Manager

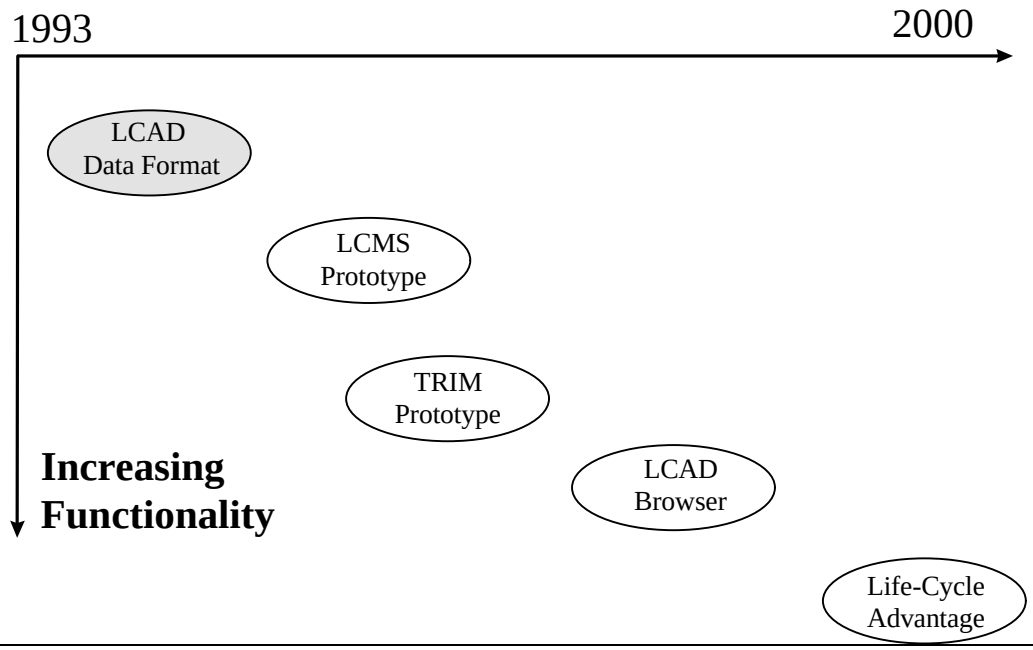
Early LCA Challenges

- Standardizing methodology, including resolving the perceived and real ambiguity associated with the methodology
- Improving access to quality data in order to:
  - Increase credibility
  - Reduce the cost
- Tools to support LCAs
  - Manage the data
  - Expedite the conduct
  - Improve transparency

R&D Sponsorship

- Tools & databases are the result of multiple R&D projects and "commercialization" effort
  - DOE Office of Industrial Technologies
  - DOE Office of Science
  - DOD Office of Naval Research
  - DOD Systems Life Cycle Readiness Center (case studies)
  - EPA Office of Pollution Prevention and Toxics
  - EPA Sustainable Technology Division (case studies)

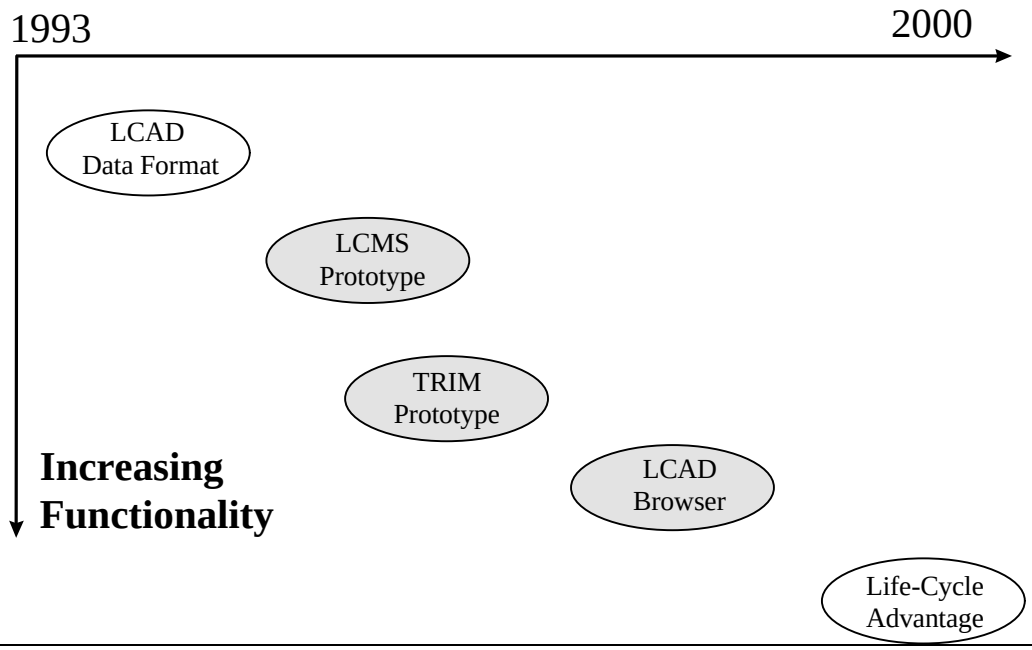
Development Progression



LCAD Industrial Guidance Group

- Chemical Manufacturer's Association (Eastman)
- Society of Plastics (Dow)
- Aluminum Association of America (Alcoa)
- Steel Recycling Institute
- American Petroleum Institute
- Electric Power Research Institute
- National Council for Clean Air and Stream Improvement for the Paper Industry
- Portland Cement Association

Development Progression



Introduction to the LCAD BrowserTM

- Viewer that reads and facilitates querying of life-cycle datasets that are archived using the “LCAD” format.
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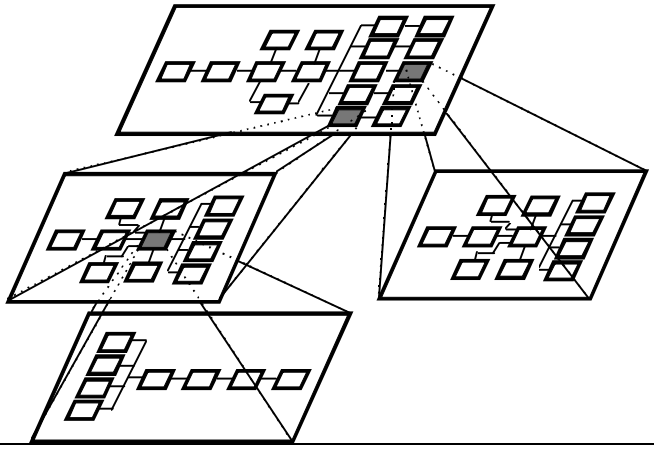
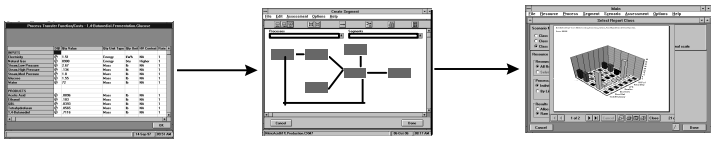
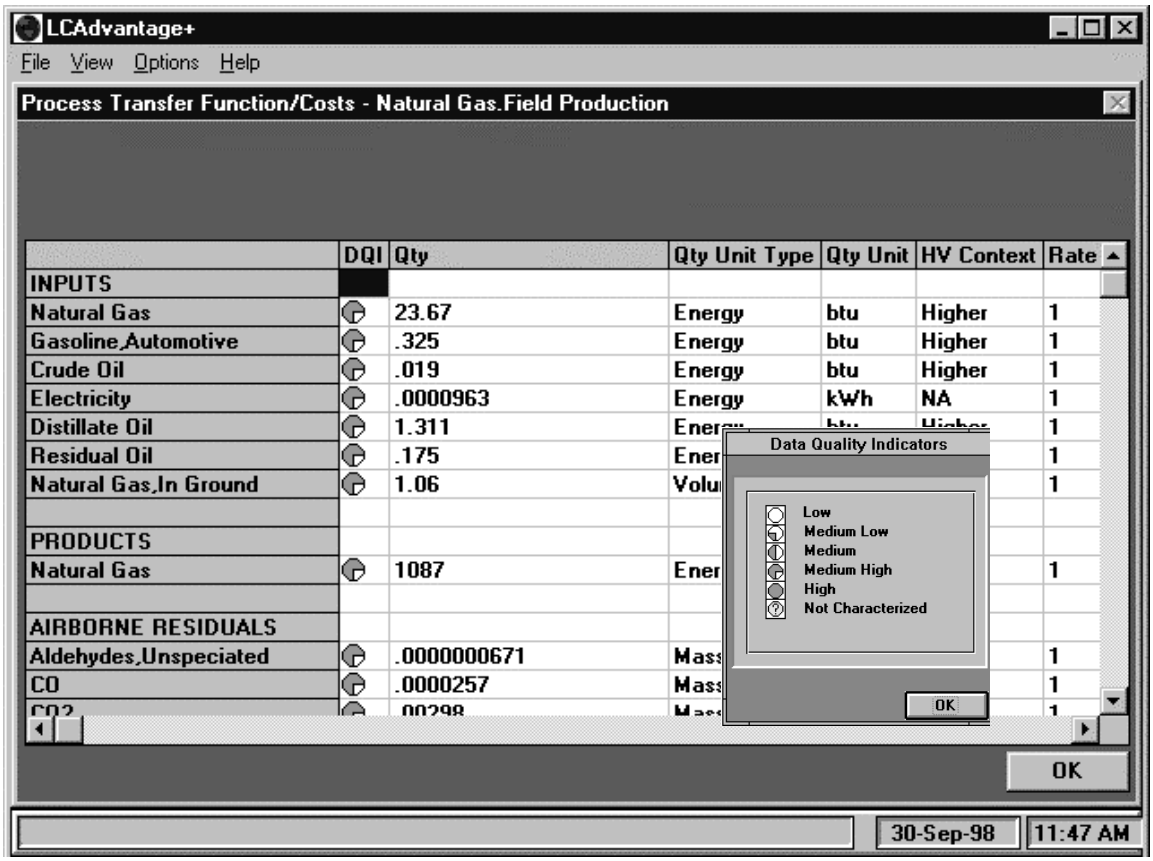


Introduction to the LCAD BrowserTM

- The software supports three major types of functionality:



Process Viewing *Graphical Viewing* *Results and Graphics Preparation*


LCAdvantage+
File View Options Help
Process Transfer Function/Costs - Natural Gas.Field Production
DQI
Qty
Qty Unit Type
Qty Unit
HV Context
Rate
INPUTS
Natural Gas 23.67 Energy btu Higher 1
Gasoline,Automotive .325 Energy btu Higher 1
Crude Oil .019 Energy btu Higher 1
Electricity .0000963 Energy kWh NA 1
Distillate Oil 1.311 1
Residual Oil .175 1
Natural Gas,In Ground 1.06 1
PRODUCTS
Natural Gas 1087 1
AIRBORNE RESIDUALS
Aldehydes,Unspeciated .0000000671 1
CO .0000257 1
Data Quality Indicators
Low
Medium Low
Medium
Medium High
High
Not Characterized
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OK
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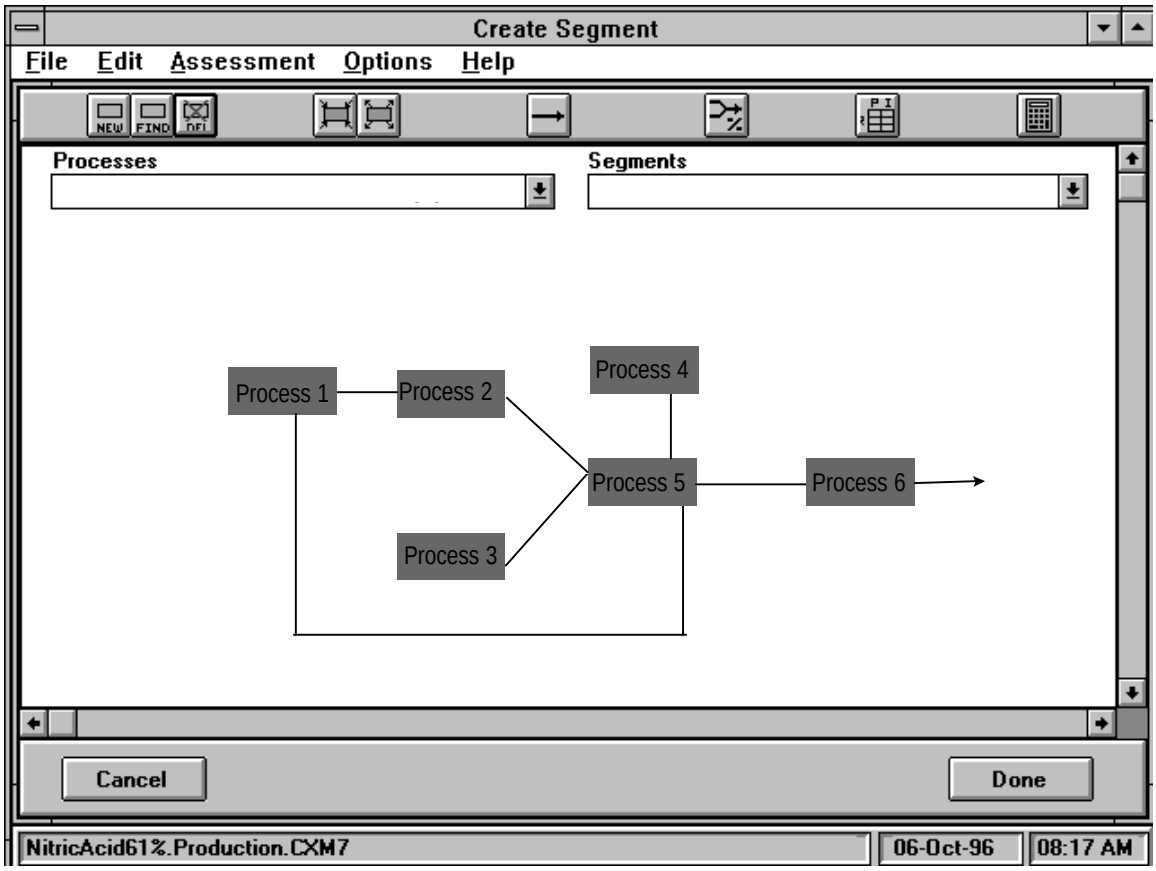
Create Segment
File
Edit
Assessment
Options
Help
NEW
FIND
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Processes
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Process 1
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Process 6
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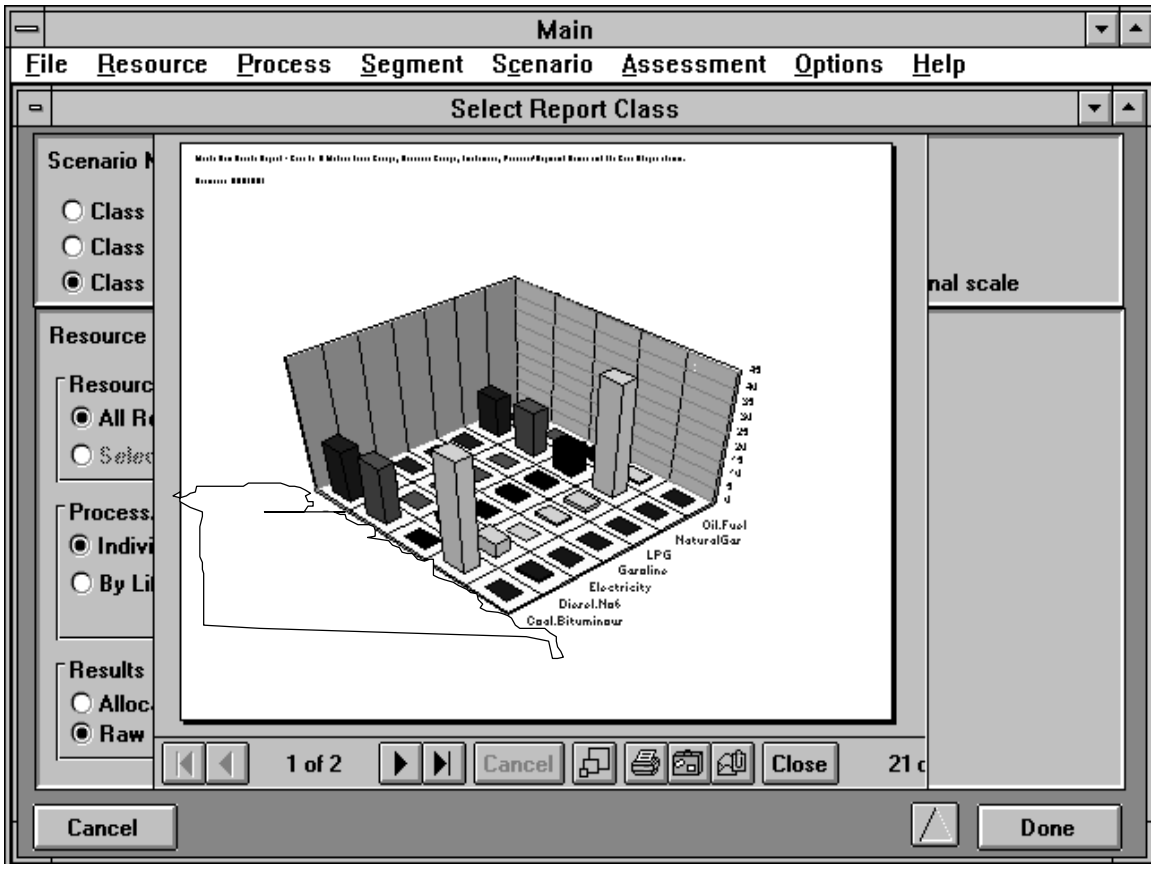
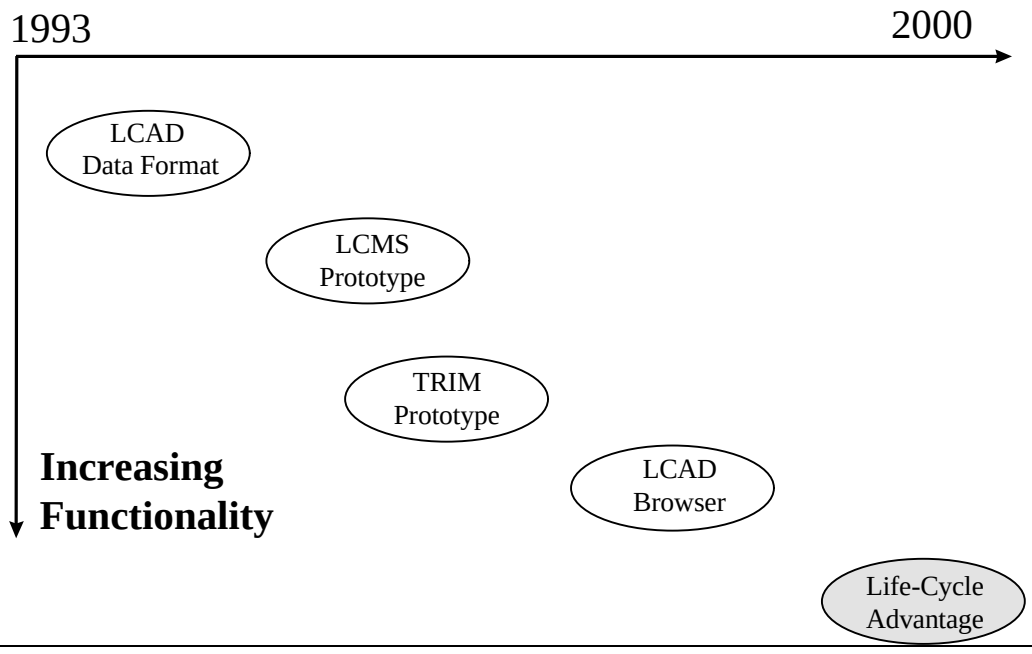
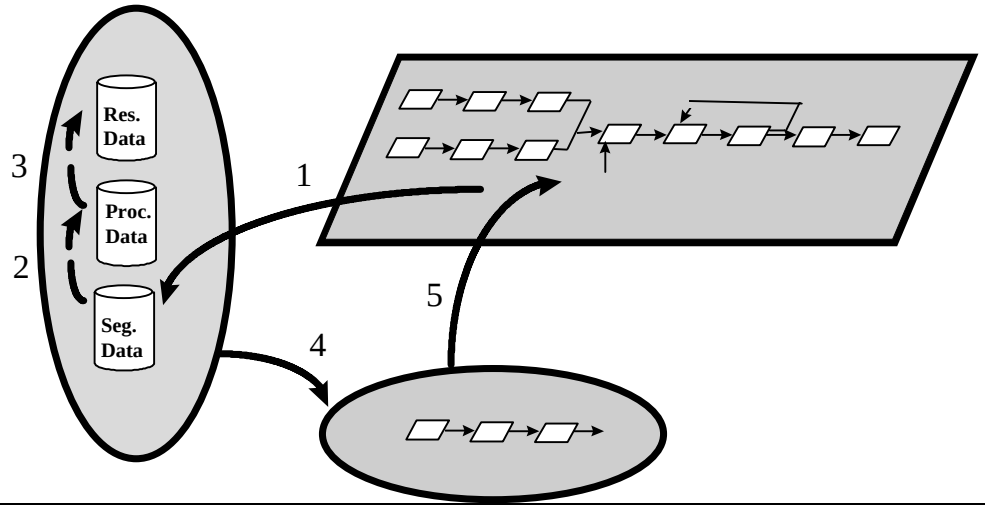


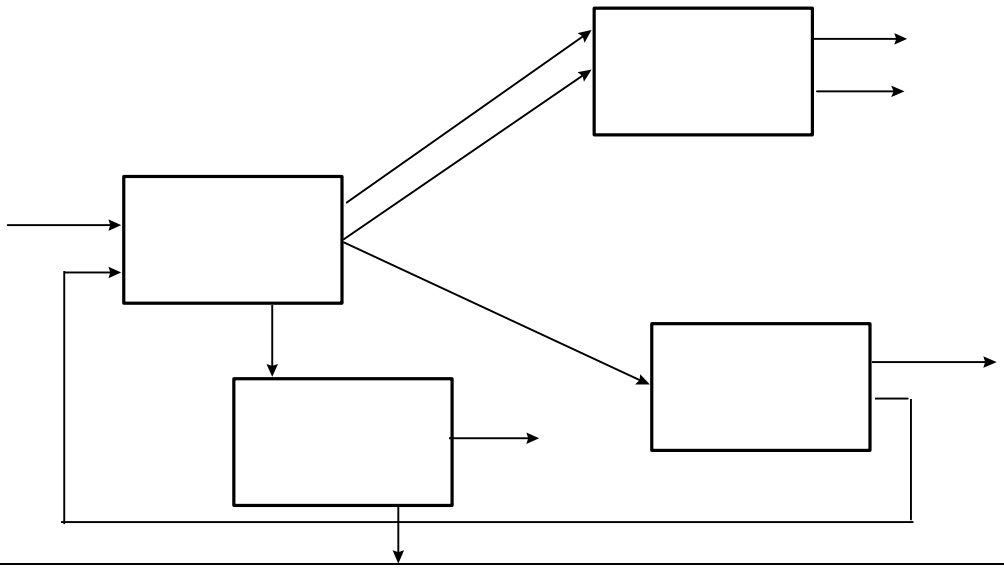
Development Progression



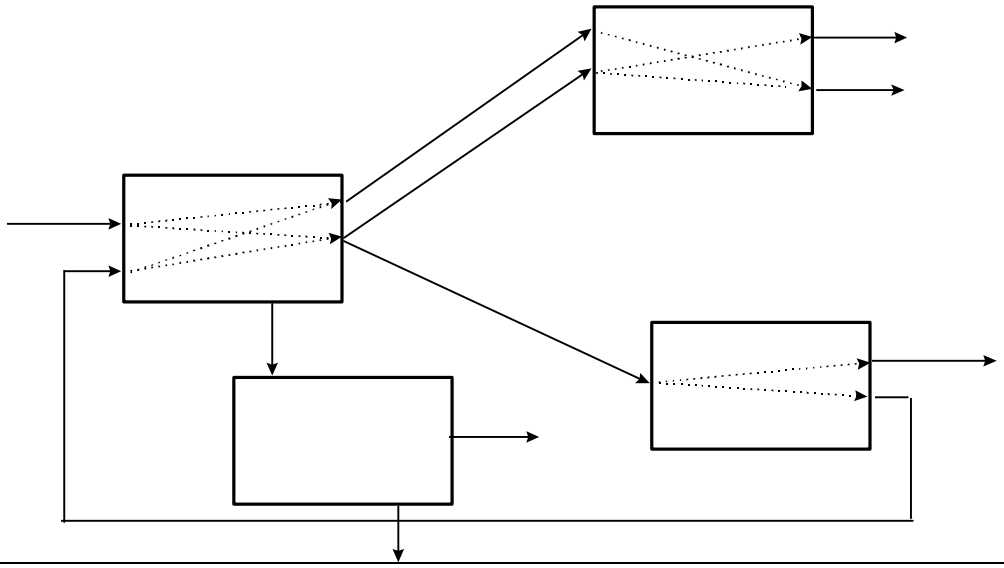
Data Management Concept



Using Scenarios: Allocated vs. System

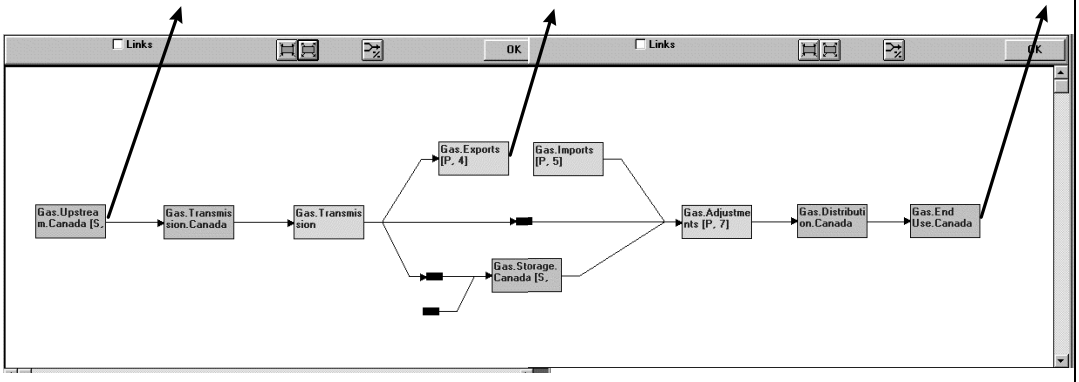


Using Scenarios: Allocated vs. System

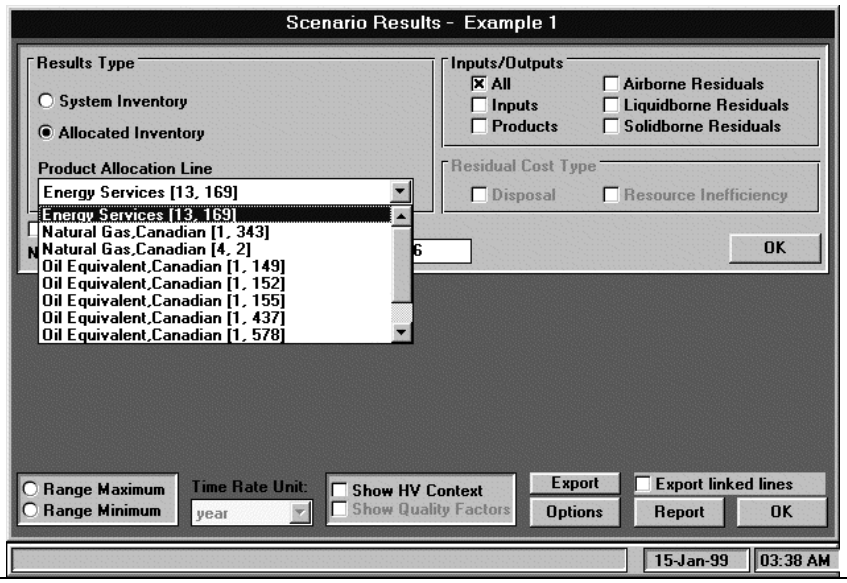


Using Scenarios

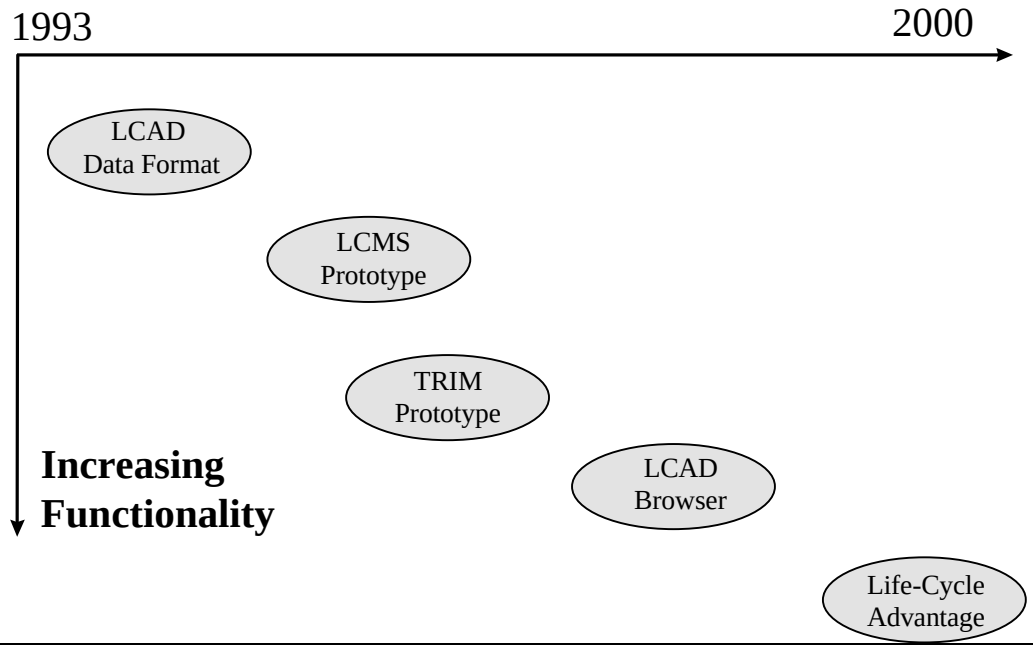
- Natural Gas System



Using Scenarios



Availability



Current LCA Challenges

- Methodology
  - Continued work in the area of impact assessment
    - Improved science, but keep it practical
    - Increased availability of equivalency/normalization data
  - Integration of methods with product/process design
    - Design considerations
    - Cost

Current LCA Challenges

- Data
  - Increase access
  - Construct infrastructure to promote data exchange
  - Data Visualization
- Tools
  - Linkages with data exchange infrastructure
  - Linkages with chemical process models
  - Linkage with CAD workstations
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